

## Chapter 8

# Techniques

General types of NBC recon techniques include search, survey, and surveillance. Search techniques are used during route, area, and zone recon missions to find contaminated areas. Survey techniques are used during NBC surveys to define the boundaries of contaminated areas. All search and survey techniques require applied

judgment based on METT-T. Terrain and the enemy will dictate which technique to use and the level of detail possible. Surveillance techniques are used to observe a specific area for indications of an NBC attack. More than one technique may be executed during a single mission.

## Search

There are three search techniques that can be employed during recon operations to locate contaminated areas. They are the zig-zag, lane, and cloverleaf. Each technique can be performed mounted or dismounted.

### Zig-Zag

This technique is useful for locating contaminated areas during route, zone, or area recon missions. The recon element begins its search at the deployment (start) line, maintaining 200 meter intervals between vehicles. Each vehicle moves forward along a line oriented 45 degrees from the start line. The vehicle crews monitor identification equipment for indications of contamination. After the vehicle has moved 500 meters along the first zig, the vehicle turns 90 degrees and zags (see Figure 8-1).

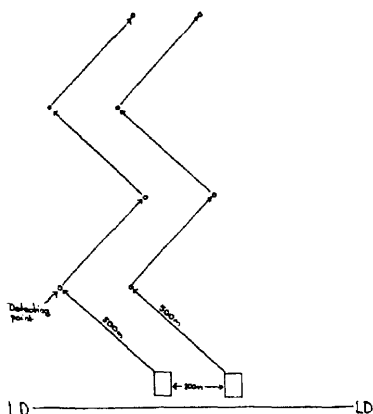


Figure 8-1. Details of zig-zag search technique.

After traveling 500 meters, the vehicle turns 90 degrees for a second zig. This process of zigging and zagging is repeated until the recon element has reached its limit of advance (LOA). If the entire mission area has been searched, the recon element reports negative contamination detected. If the recon element did not search the entire mission area, the element begins a new sweep of the mission area. This process is repeated until contamination is detected or the complete mission area is searched (see Figure 8-2).

The zig-zag technique has a higher probability of detecting contamination, because the surface area not traversed by the recon element is less than that of other

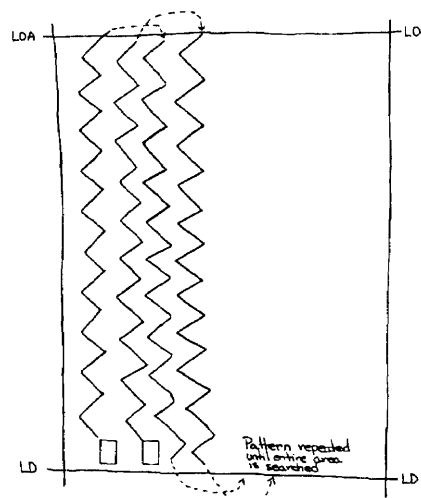


Figure 8-2. Example of multiple sweeps, using the zig-zag search technique.

search techniques. The length of each zig and zag is based on METT-T, VOS25 or global positioning system (GPS) devices provides navigation assistance.

## Lane

The lane technique is very similar to the zig-zag method and is used to locate contaminated areas. While the zig-zag technique can be used during route, area, and zone recon missions, the lane technique is used primarily during route recon missions. It could also be used for area recon of long narrow pieces of terrain, such as defiles. The recon element begins its search at the line of departure (LD) with an interval not exceeding 200 meters between vehicles. For narrow routes, the recon element has to move in a staggered column. Each vehicle moves along a line until reaching the LOA (see Figure 8-3). The vehicle crews monitor identification equipment for indications of contamination. Readings for contamination are taken every 500 meters.

When the recon element reaches the LOA, if the entire mission area has been searched, the recon element reports negative contamination detected. If the recon element did not search the entire mission area, the element begins a new sweep of the mission area. This process is repeated until contamination is detected or the complete mission area is searched (see Figure 8-4).

## Clover-Leaf

This technique is used primarily during dismounted operations. A soldier dismounts from his vehicle and moves in a clover-leaf pattern. The vehicle is used as the center of the search (Figure 8-5), and each leaf extends between 50 to 200 meters from the vehicle. This technique

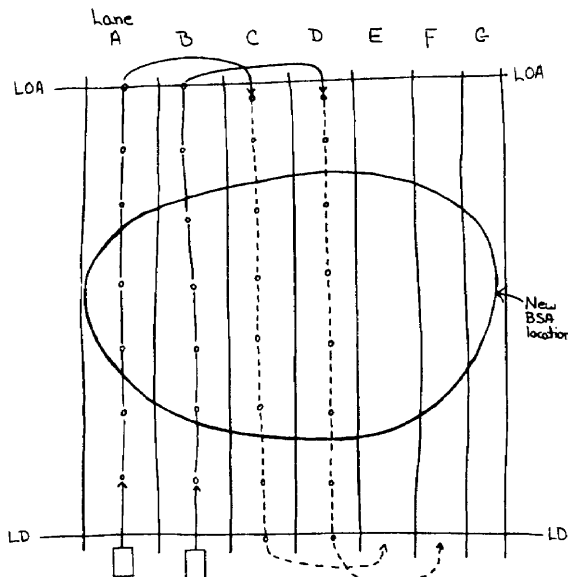


Figure 8-3. Lane search technique.

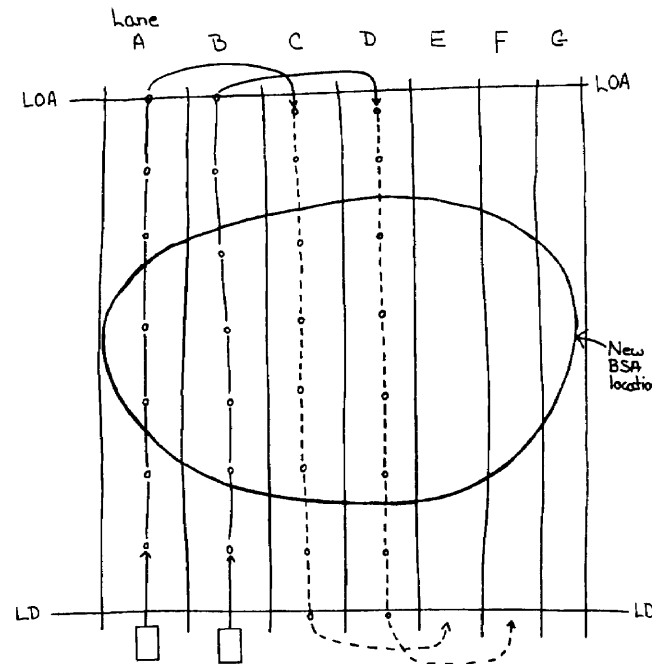


Figure 8-4. Multiple sweeps, using the lane search technique.

should not be used in radiologically contaminated areas because of the lack of shielding. The CAM is the primary detection tool dismounted soldiers use to detect chemical contamination, followed by M8 and M9 detector paper. Detectors tickets from M256A1 chemical detector kit are used by the mounted vehicle crew to determine the presence of chemical agent vapors. This technique can be

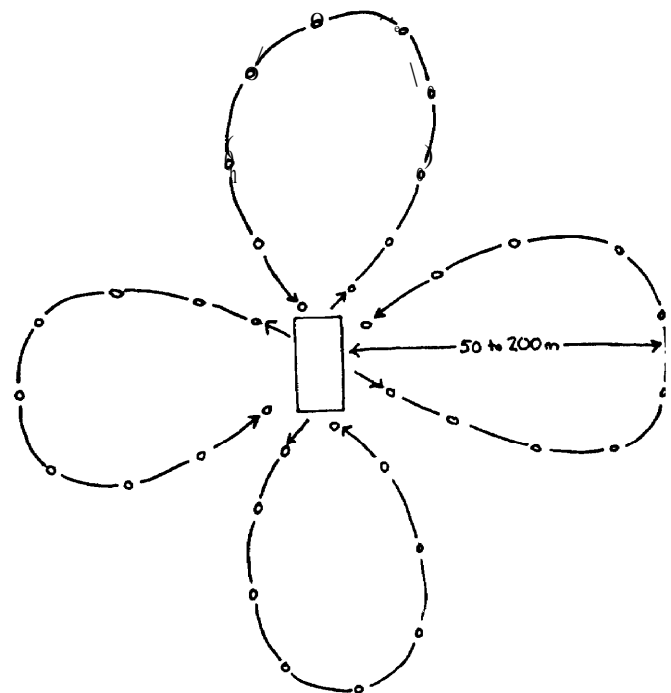


Figure 8-5. Clover-leaf search technique.

accomplished using a single recon vehicle, a two-section, or three-section reconnaissance element.

This technique is used primarily in restricted terrain or to ensure sites for high value facilities, such as command and control centers, are free of contamination. The

clover-leaf technique is time-consuming; however, it provides detailed coverage and information about an area. This technique also exposes soldiers to chemical hazards and heat stress.

## Survey Techniques

There are three survey techniques that can be employed once contamination is located. These techniques are near-side-far-side, box, and star. Radiological survey techniques are discussed in detail in FM 3-3-1. Each technique is usually performed while mounted to minimize exposure of soldiers performing the survey to CB hazards. There are two types of surveys-complete or incomplete. A complete survey is when the entire extent of the contamination has been identified. An incomplete survey occurs when the entire extent of contamination has not been identified. This can occur when an NBC recon unit has to conduct a survey to find a bypass route during combat operations.

If no contamination is detected, a warning marker is placed. Each vehicle in the element executes this process to determine the near and far side boundaries of the contamination (see Figure 8-6).

It is possible that the right and left limits of the contamination are not identified, even though the right and left reconnaissance vehicles determined a near and far side (see Figure 8-7). In this case, the recon element can shift vehicles to the right and left to attempt to find those boundaries or execute a box survey technique. The lateral spacing between vehicles is important to quickly locate all boundaries of the contaminated area. Once the boundaries are located, clear bypass routes can be easily located.

### Near-Side-Far-Side

This technique is used by the recon element once a vehicle enters the contaminated area. All vehicles in the recon element stop. Each vehicle crew determines if they are in the contaminated area. Vehicles in the contaminated area move back along their original path for 200 meters and again check for contamination (see Figure 8-6). If they are out of the contaminated area, emplace the appropriate warning markers. If they are still in the contaminated area, they move back another 200 meters and test again. This process is repeated until they are clear of the contamination. Once the initial vehicle has found the near side boundary of contamination, it moves forward across the contaminated area, testing every 200 meters.

Once the crew no longer detects any contamination, the vehicle moves forward another 200 meters and tests again.

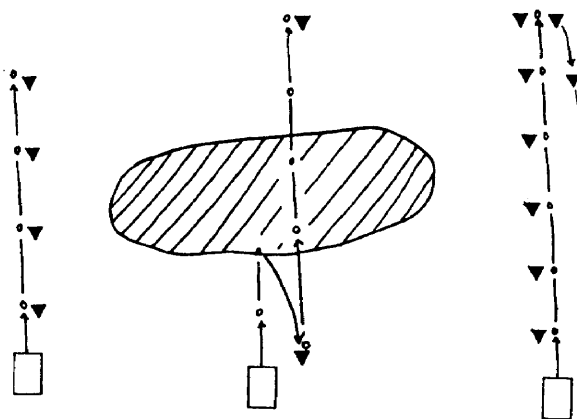


Figure 8-6. Near-side-far-side survey technique.

### Box

The box technique is used to determine the general dimensions of the contaminated area (length and width). This technique is best employed by a section (three vehicles). The process starts once a vehicle enters the contaminated area. All vehicles in the recon element stop. All vehicles check for contamination in their immediate areas. The first vehicle to report contamination becomes the base vehicle. If any other vehicles in the element are located in the contaminated area, they must back out of the contamination. All vehicles in the element should orient on the base vehicle, at least one vehicle should be to the right and left of the base vehicle.

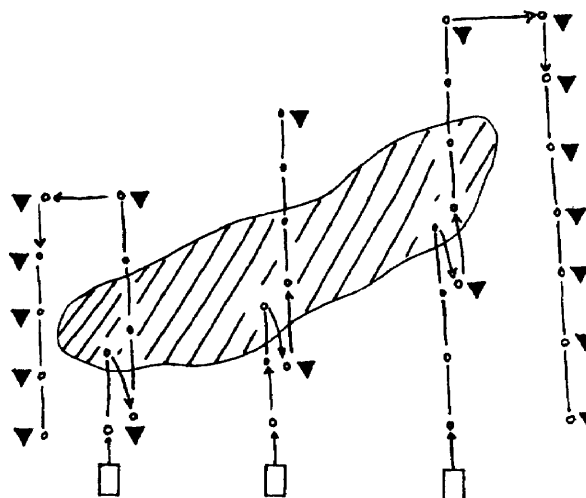


Figure 8-7. Contaminated area extends past initial right limit of the survey.

The base vehicle has the mission to move forward and find the far side of the contamination. The crew continues to check for contamination every 200 meters. When the crew fails to get a positive reading, they proceed another 200 meters and establish the initial farside line. The vehicle to the right of the base vehicle places a warning marker to indicate the initial near side. This vehicle then moves forward 200 meters and checks for contamination.

The crew can find two things at this point, contamination or no contamination. If contamination is detected, the vehicle turns 90 degrees to the right and moves 200 meters and checks again. If no contamination is found, the vehicle moves forward 200 meters and checks again. This process of going straight or turning will continue in a box-like movement until the vehicle has crossed the initial far side line, this is the initial right limit of the contamination. The movement of the vehicle depends on the orientation of the contaminated area.

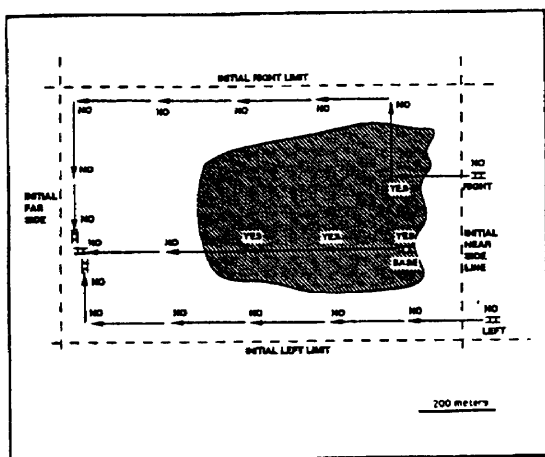


Figure 8-8. Box survey technique on orientation A.

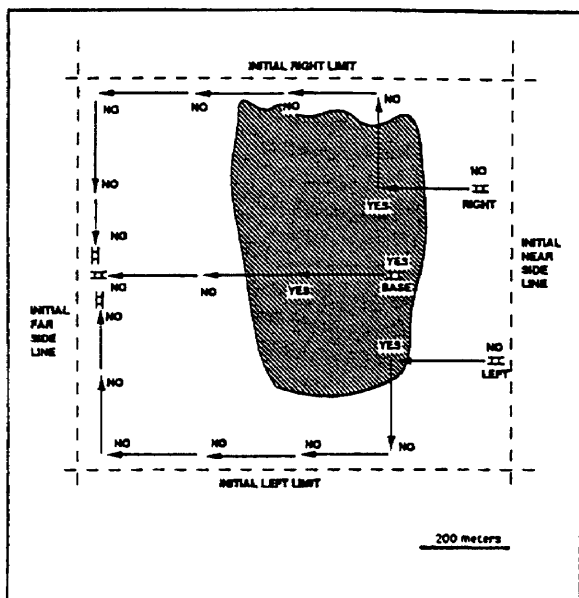


Figure 8-9. Box survey technique on orientation B.

Figures 8-8 through 8-11 demonstrate the execution of a mission for various orientations.

Once the vehicle has reached the initial far side line, the vehicle moves toward the base vehicle while checking for contamination. The vehicle to the left of the base vehicle executes the same movement as the right vehicle, except its first turn will be to the left. While this may sound complicated, it is not difficult to execute. The section leader must receive continuous reports from the other vehicles on their findings, positive or negative. From these reports the section leader plots the findings to get a general idea of the layout of the contamination. Good navigational

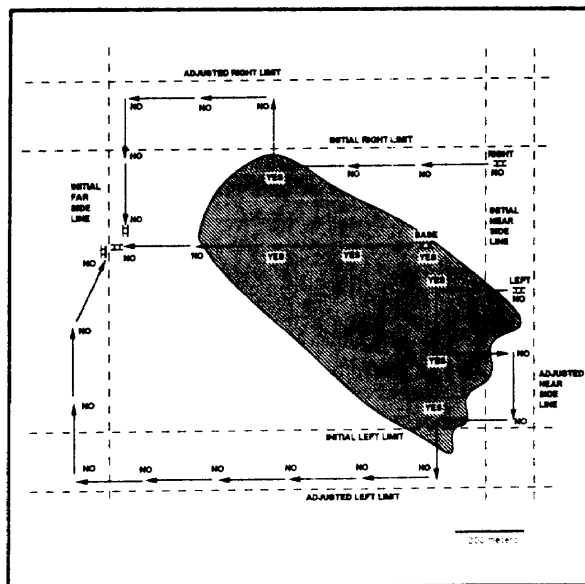


Figure 8-70. Box survey technique on orientation C.

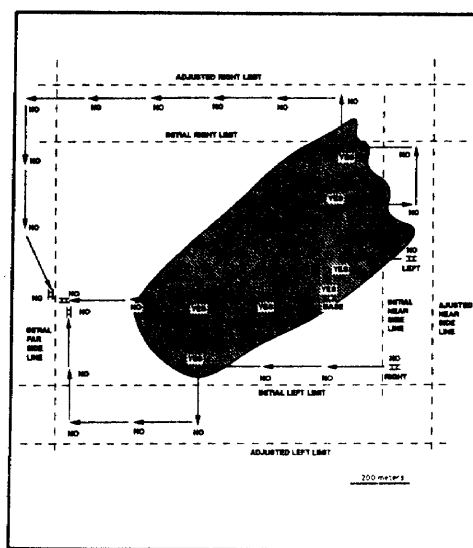
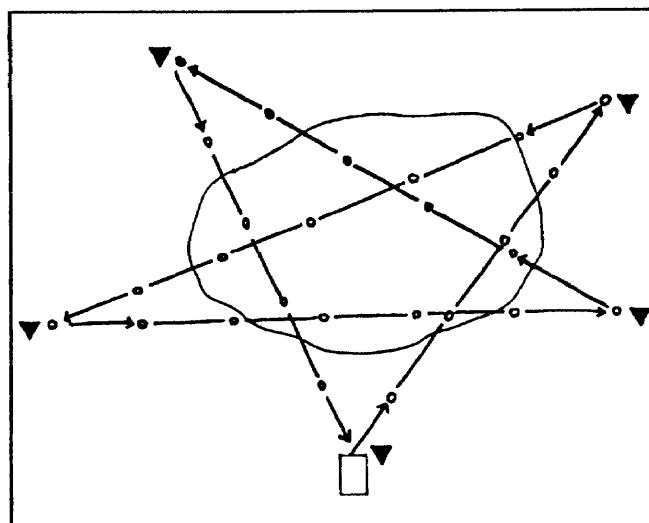


Figure 8-11. Box survey technique on orientation D.

skills and aids (GPS, VOS25, Loran) are essential for this operation.



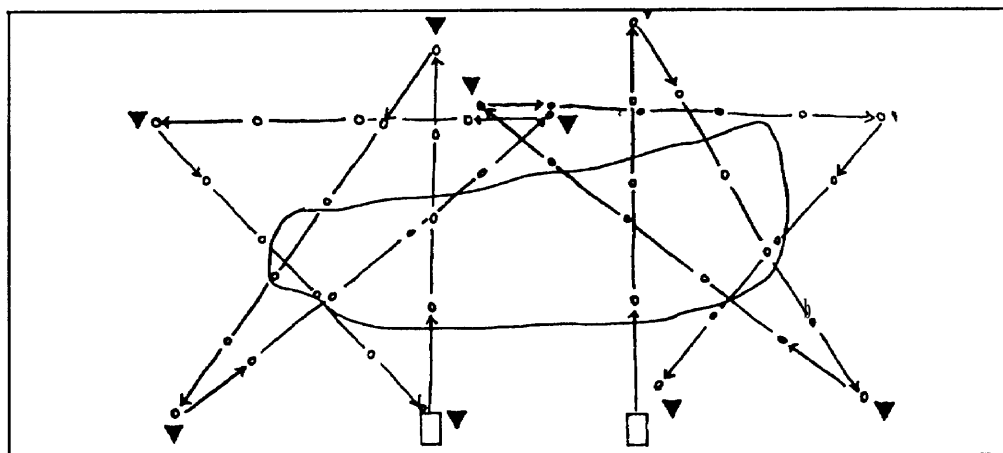
*Figure 8-12. Star survey technique.*

Once the section leader is satisfied that the limits of the contamination have been determined, the section locates the best route to bypass the contamination. Warning markers are erected around the contamination along any trails leading into the contaminated area. The bypass route is clearly marked.

### **S t a r**

This is a very quick technique to determine the rough limits of a contaminated area. The vehicle that encounters the contamination, moves back from the contaminated area 200 meters from the last positive reading. This point is the base of the star. The vehicle posts a warning marker. The vehicle then proceeds forward, detecting every 200 meters to find the far side. Once the vehicle has detected no agent, it proceeds for another 200 meters and tests again. If no agent is detected, another warning marker is posted. This ends the first leg of the star.

The vehicle turns about 135 degrees and travels in that direction detecting every 200 meters. If no contamination is detected on this leg, the vehicle should not travel any longer than the length of the initial leg. This process is repeated until the vehicle arrives at or near the base of the star (see Figure 8-12). This technique can be used by a squad or section to obtain more detecting points, increasing the accuracy of the survey (see Figure 8-13).



*Figure 8-13. Pattern of an NBC recon squad performing star survey technique with two vehicles.*

## **S u r v e i l l a n c e   T e c h n i q u e s**

NBC surveillance is the systematic observation of a specific area for indications of an NBC attack, usually a chemical attack. These designated areas are typically named areas of interest (NAI), identified during the IPB. NBC recon units watch and listen to observe designated areas for any indications of a chemical attack. The primary means of surveillance are observation posts (OPS). Another means is conducting routine patrols through the area of operations. This technique of surveillance normally is conducted in rear areas, typically along main supply routes (MSRs) and road networks.

An OP is a position occupied to observe a designated area. From the OP(s), NBC recon units report any

indication of NBC attack and enemy activity. An NBC recon platoon can occupy up to six OPS, one per team, for up to 12 hours. For extended periods, the platoon can occupy OPS by squad.

### **S e l e c t i n g   a n   O P   S i t e**

The supported unit or platoon leader selects the general location for the OPS. The factors of METT-T determine the general positioning as well as the intelligence collection plan and R&S plan. The squad and team leaders select the

exact position for the IOP when they are on the ground. An OP should have the following characteristics:

- Good observation of the assigned area.
- Good cover and concealment. Positions with cover and concealment reduce vulnerability and increase survivability on the battlefield. They may need to trade off a position with the best observation capability and no cover and concealment to get a position that provides better survivability.
- Does not attract attention. Select positions that do not attract enemy attention.
- Does not skyline observers. Avoid hilltops. Position OPs farther down the slope of a hill.

## Manning the OP

A minimum of two personnel are alert at all times. One individual observes the area while the other provides local security. The individual providing local security records information and submits reports as necessary. The two individuals switch positions every 20 to 30 minutes.

## Attack Indicators

Most chemical agents are disseminated by explosive delivery systems or by spray tanks. Artillery, rockets, and missiles detonating have a distinctive visual signature both in the daytime and at night. Aircraft spraying chemical

agents also have distinctive flight patterns along with the signature of the liquid being released. While these indicators are not positive proof that a chemical attack has occurred, there is an increased probability it has.

Depending on METT-T, the NBC recon element occupying the OP could conduct recon of the NAI to confirm or deny the presence of contamination.

### Warning

**Exercise care, because the enemy could have delivered scatterable antipersonnel/antitank mines or other delay type explosive munitions.**

## Detection Procedures

NBC recon tactics and techniques are basically the same when using either the M113, HMMWV, or the M93 NBCRS. Detection procedures are different between the NBCRS- and M113/HMMWV-equipped units. Nonchemical units use the same detection procedures used by M113 or HMMWV-equipped NBC recon units.

With the M113 or HMMWV, there is a great deal of stopping and exiting the vehicle for detecting and identifying; and the rate of the NBC recon is much slower. With the M93 NBCRS, NBC recon is conducted on the move at a much faster rate with very few stops, and without the crew having to exit the vehicle.

## M 113 / H M M W V - E q u i p p e d U n i t s

Using the M 113 or HMMWV as a prime mover and standard NBC detection, identification, and CB sampling equipment, the following procedures may be used to determine the presence of radiological or chemical hazards or to collect suspect samples for laboratory analysis.

The team leader (TL) provides overwatch for his or her area and orients the organic weapon on the sector of fire. The TL visually inspects the area for signs of contamination hazards. The chemical operations specialist (COS) opens the rear door of the M113 wide enough to take a reading with his NBC detection and identification equipment or to collect a suspect sample of CB contamination. The rear door of the M113 has a wire or bungee cord attached to prevent the door from swinging fully open.

With M8 paper attached to a long handle or stake, the COS extends the stake out of the rear door of the M113 or over the side of the HMMWV and touches the ground or vegetation with the M8 detector paper.

The TL also conducts periodic checks from the hatch position, using the M256A1 chemical detector kit. The TL places the expended M256A1 detector tickets in a

waterproof bag after writing the check point number on the paper tab.

The COS inspects the M8 paper for signs of contamination and informs the TL of the results. Positive M8 paper is sealed in a plastic bag. A label showing the date-time group (DTG), location (grid) where the sample was taken, and the possible type of contamination is attached. The sample bag is placed inside a large waterproof bag which holds all samples collected during the mission.

The COS places the CAM outside the door approximately one meter above the ground and checks for contamination. If contamination vapors are detected and there is doubt as to the validity of the results, the COS uses the M256A1 chemical detector kit to verify results. All expended M256A1 tickets are bagged.

**Note:** If a positive reading for chemical contamination is obtained, move back 100 to 200 meters from the position where the initial positive reading was detected and repeat the procedure until a negative reading is obtained.

The COS can exit the vehicle, if necessary, and check the area around the vehicle for contamination using M8 paper and the CAM.

The COS collects samples of any small dead animals, discolored leaves, soils, and so forth, as stated in the OPOD or orders from higher headquarters and reports all findings to the TL.

The TL or driver records all findings on appropriate forms.

## **M 9 3 - N B C R S - ( F o x ) - E q u i p p e d      U n i t s**

The M93 NBCRS is equipped with a mobile mass spectrometer (MM1), radiation detection unit (ASG1), vehicle orientation system (VOS25), and other detection and identification equipment giving users the capability to travel at optimum speeds while checking for NBC contamination. See FM 3-101-1 for a detailed discussion of M93 NBCRS tactics, techniques, and procedures.

The MM1 monitors organic substances in the air, in dust, in solution, or on surfaces.

There are basically three modes of operations for the M93 NBCRS:

- Double-wheeled sampling unit. This mode permits transporting liquid contamination to the probe bad of the MM1 for agent identification.
- Air. Air is drawn into the MM1; and vapor contamination is identified.
- Surface. This mode is used once the agent is detected to verify its presence, using the MM1.